PATENT COOPERATION TREATY

From the:
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

Collison & Co
GPO Box 2556
ADELAIDE SA 5001

PCT

NOTIFICATION OF TRANSMITTAL OF INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Rule 71.1)

Date of mailing *(day/month/year)* 1 AUG 2005

Applicant's or agent's file reference
54616PCT KMC:PFB

IMPORTANT NOTIFICATION

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/AU2004/000941	14 July 2004	14 July 2003

Applicant

MUTABAZI, Steven Luzima

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary report on patentability and its annexes, if any, established on the international application.

2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.

3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translations to those Offices.

4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices)(Article 39(1))(see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the *PCT Applicant's Guide.*

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed invention is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the IPEA/AU	Authorized officer
AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. (02) 6285 3929	JUZER KHANBHAI Telephone No. (02) 6283 2176

COLLISON & CO.
- 3 AUG 2005
REF. .....

Form PCT/IPEA/416 (January 2004)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 54616PCT KMC:PFB	**FOR FURTHER ACTION**	See Form PCT/IPEA/416
International application No. **PCT/AU2004/000941**	International filing date *(day/month/year)* 14 July 2004	Priority date *(day/month/year)* 14 July 2003

International Patent Classification (IPC) or national classification and IPC

Int. Cl. [7] H04L 12/28, 12/56

Applicant

MUTABAZI, Steven Luzima

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 3 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. [X] *(sent to the applicant and to the International Bureau)* a total of 7 sheets, as follows:
      - [X] sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      - [ ] sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

   b. [ ] *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or table related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

[X]	Box No. I	Basis of the report
[ ]	Box No. II	Priority
[ ]	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
[ ]	Box No. IV	Lack of unity of invention
[X]	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
[ ]	Box No. VI	Certain documents cited
[ ]	Box No. VII	Certain defects in the international application
[ ]	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of the report
13 May 2005	26 July 2005
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer **JUZER KHANBHAI** Telephone No. (02) 6283 2176

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/AU2004/000941

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:

☐ international search (under Rules 12.3 and 23.1 (b))

☐ publication of the international application (under Rule 12.4)

☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

☐ the international application as originally filed/furnished

☒ the description:

pages **1-9** as originally filed/furnished
pages* received by this Authority on with the letter of
pages* **10-13** received by this Authority on **13 May 2005** with the letter of **13 May 2005**

☒ the claims:

pages as originally filed/furnished
pages* as amended (together with any statement) under Article 19
pages* **14,16** received by this Authority on **13 May 2005** with the letter of **13 May 2005**
pages* **15** received by this Authority on **24 June 2005** with the letter of **24 June 2005**

☒ the drawings:

pages **1/8-8/8** as originally filed/furnished
pages* received by this Authority on with the letter of
pages* received by this Authority on with the letter of

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages
☐ the claims, Nos.
☐ the drawings, sheets/figs
☐ the sequence listing (*specify*):
☐ any table(s) related to the sequence listing (*specify*):

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages
☐ the claims, Nos.
☐ the drawings, sheets/figs
☐ the sequence listing (*specify*):
☐ any table(s) related to the sequence listing (*specify*):

* *If item 4 applies, some or all of those sheets may be marked "superseded."*

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-10	YES
	Claims	-	NO
Inventive step (IS)	Claims	1-10	YES
	Claims	-	NO
Industrial applicability (IA)	Claims	1-10	YES
	Claims	-	NO

2. Citations and explanations (Rule 70.7)

Claims 1-10: The invention defined in the amended claims relate to data and voice digital communication network installation which has the ability to provide access to the main backbone at intermediate points at a speed of less than 2.5 gigabits per second thus, providing this lesser bandwidth rate by providing access to a proportion of the backbone communication bandwidth which is less than one wavelength.

No individual citation or obvious combination of citations discloses all of the features of all the claims and hence, the claimed invention is novel and inventive.

BEST MODE FOR CARRYING OUT THE INVENTION

Referring in detail to the drawings, Figure 1 the current networking backbone system based on high a bandwidth inter-capital transmission backbone comprised of dedicated circuit based channels, providing connectivity between some of Australia's capital city hubs, and transmission backbones linking out-lying hubs to the capital city hubs. In this networking backbone system, provision of sufficiently high transmission speeds for carriage of data and voice traffic to and from hubs outside the capital cities, is uneconomical and is therefore only attempted when high traffic volumes are to be carried. For example, high transmission speeds between Sydney and out-lying hubs such as Griffith, Armidale, and Dubbo would be uneconomical.

These high volume high traffic links are typically provided by long-haul dense wavelengths division multiplexing (DWDM) transmission systems. These systems distribute bandwidth to terminating sites in the form of whole wavelengths. Such wavelengths have a capacity in the order of 2.5 gigabits per second.

These constraints in transmission backbone speeds have resulted in the current hub connectivity system. In this hub connectivity system it can be seen that high bandwidth connectivity is possible for inter-capital hub connectivity, but for other hubs it is constrained by the distance-dependent pricing of the transmission backbones between these hubs and their respective capital city hubs.

These transmission backbones are provided using, at the primary hubs, DWDM transmission systems capable of transmitting one or many wavelengths. Multiple services may be aggregated into a single wavelength for this transmission.

However, interconnectivity can be provided only at the level of a full wavelength . That is, any terminal must receive or insert a full wavelength or whole optical channel. This means it is only possible to provide bandwidth in large blocks which cannot be economically utilised by smaller traffic generators, in particular , Australian towns, smaller than the capital cities.

In contrast to the current networking backbone system illustrated in Figure 1, and referring specifically to Figure 2, it will now be seen as between Brisbane and

Sydney that there are two parallel connections termed Corridor 1 and Corridor 2 and that in each of these, there are a number of intermediary hubs from which further direct connections can be made to more localised locations.

The same can be seen to be that position with connections between Sydney and Melbourne where there are now two routes, namely Corridor 3 and Corridor 4, which respectively go through a number of smaller hubs and towns, for instance Corridor 3 goes through Wollongong, and then to Canberra, Albury, Wangaratta and Corridor 4 goes from Sydney to Shepparton, Bendigo, Gisborne and then Melbourne.

A single Corridor 5, connects from Melbourne through Adelaide to Perth, and in this case, an intermediary connection between Melbourne and Adelaide can be in Geelong and Ballarat.

An intermediary connection between Adelaide and Perth can be at Kalgoorlie, but of course, there can be a number of further intermediary hubs which will be of relatively small cost and provide those connections with very high quality and high speed voice and digital communication.

These primary hubs are connected by conventional DWDM transmission platforms.

With a secondary connectivity mesh which may be at a somewhat lesser speed than would be available through light transmitting fibres, there can now be seen to be a number of interconnections that can be made which provide still very high quality communication even though the quantity of traffic might be less.

Figure 3 shows high bandwidth connectivity for both secondary and tertiary hubs that now becomes possible again at very significant cost savings.

Figure 4 illustrates how the networking backbone corridors system can be used to incorporate more hubs and to create bandwidth aggregation points for connections to multiple customers.

It is then possible to establish an extended high bandwidth hub connectivity system such as illustrated in Figure 5.

The same method of high bandwidth networking backbone corridors can further be applied to the geographic area of a capital city. Figure 6 illustrates how this method can be applied to the city of Melbourne, thereby further extending the national and regional networking backbone corridors system, to include a specific metro networking backbone corridors system that is appropriately integrated with the former.

Figure 7 shows the physical connectivity in a network including four tiers, where a further set of hubs, called in this instance neighbourhood hubs, is included. A first hierarchical tier of hubs, P1 and P2, called primary hubs is connected physically by optical fibre, via a number of hubs of a second hierarchical tier called secondary hubs, S1-3. A third hierarchical tier of hubs, T1-6, called tertiary hubs is connected to each other or to secondary hubs. The neighbourhood hubs, N1-16 form a fourth hierarchical tier.

The logical connectivity for this physical system is shown in figure 8. Logically each hub in a tier has connections to two hubs in the next higher tier.

The tertiary hubs can be connected by using currently installed infrastructure except that the connection's distance to a main hub or to a sufficiently high speed connecting hub is very much less than has hitherto been the case in existing telecommunication networks.

What can now be seen to have been provided is a communication network method and installation which provides for a economical communications carriage to carry both data and voice and voice like signals solely as addressed digital logic packets by providing this at least in a backbone system and distributed mesh networks such that the speed of communication will be sufficient to provide very good voice or other equivalent analogue signal transmissions as well as data.

This is provided by a transmission speed of at least approximately 2.5 gigabits per second along a main backbone and uniquely capable, and in fact having intermediary connections providing for mesh communication networks both for primary and secondary networks where secondary would be normally at a transmission speed that might be a proportion only of the main backbone communication bandwidth.

As would be appreciated by those skilled in the art, this transmission speed of 2.5

gigabits per second is provided in a DWDM system by using a full wavelength . Thus the proportion only of the main backbone communication bandwidth is provided by a part only of a bandwidth. It is therefore the case that secondary, tertiary and neighbourhood hubs are capable of dropping and inserting from and to the main back-bone, communication channels which are less than a full wavelength.

Although the invention has been herein shown and described in what is conceived to be the most practical and preferred embodiment, it is recognised that departures can be made within the scope of the invention, which is not to be limited to the details described herein but is to be accorded the full scope of the appended claims so as to embrace any and all equivalent devices and apparatus.

CLAIMS

1. A data and voice digital communication network installation providing a backbone communication bandwidth including optical transmission means solely through addressed digital logic packets of at least 2.5 gigabits per second, being the capacity of one wavelength, between geographically substantially dispersed locations being primary hubs, and having at least one light transmitting fibre through which the transmission is effected with means at respective ends, being the primary hubs, of the fibre to effect an input and output of the communication signals at a rate which is at least the said bandwidth, and further having at least one intermediate means being a secondary hub which is substantially geographically dispersed from said locations of the primary hubs to effect an input and output through addressed digital logic packets into the fibre, and means to then effect transmission of and signals from said secondary hub to a further geographically dispersed location at a rate which is less than the said bandwidth between said primary hubs, said secondary hub being adapted to provide this lesser bandwidth rate by providing access to a proportion of the backbone communication bandwidth which is less than one wavelength.

2. A data and voice digital communication network installation including a plurality of packet communication networking hubs, logically configured in a hierarchy of at least two tiers, a transmission backbone network linking said hubs, including at least one light transmitting fibre with means to extract signals from and apply signals to the fibre which are at least a proportion of end to end signals being carried by the fibre said proportion being less than a single wavelength being carried by the transmission backbone, said signals being extracted to and received from the packet communications networking hubs, at a plurality of selected locations, including at least one which is not located at a primary hub, wherein the logical configuration of a given hub is substantially independent of its physical connectivity to the transmission backbone network.

3. A data and voice digital communication network installation as in claim 2, wherein a logical connectivity scheme is constructed and is operated so that it provides a first logical connectivity mesh linking each of a plurality of hubs

comprising a first hierarchical tier of hubs, at least one second connectivity mesh linking each of a plurality of hubs comprising a second hierarchical tier of hubs to at least two hubs of said first tier.

4. A data and voice digital communication network installation as in claim 3, wherein said logical connectivity scheme further includes point to point connectivity between each of a plurality of hubs comprising a third hierarchical tier of hubs and at least one hub from a higher hierarchical tier and point to point connectivity between any hub and selected locations external to the communication network scheme.

5. A method of operating a data and voice digital communication network including a plurality of packet communication networking hubs, logically configured in a hierarchy of at least two tiers, a transmission backbone network linking said hubs, including at least one light transmitting fibre, extracting signals from and applying signals to the fibre which are at least a proportion of end to end signals being carried by the fibre, said proportion being less than a single wavelength being carried by the transmission backbone, said signals being extracted to and received from the packet communications networking hubs, at a plurality of selected locations, including at least one which is not located at a primary hub, wherein the logical configuration of a given hub is substantially independent of its physical connectivity to the transmission backbone network.

6. A data and voice digital communication network as in claim 5, further including the construction and operation of a logical connectivity scheme including a first logical connectivity mesh linking each of a plurality of hubs comprising a first hierarchical tier of hubs, at least one second connectivity mesh linking each of a plurality of hubs comprising a second hierarchical tier of hubs to at least two hubs of said first tier.

7. A data and voice digital communication network as in claim 6, wherein said logical connectivity scheme further includes point to point connectivity between each of a plurality of hubs comprising a third hierarchical tier of hubs and at least one hub from a higher hierarchical tier and point to point connectivity between any hub and selected locations external to the communication network scheme.

8. A data and voice digital communication network installed in Australia providing for at least one communication network between Sydney and Melbourne which provides for a bandwidth of at least approximately 2.5 gigabits per second and has at least one intermediate node where the communication method is solely directed toward addressed digital packet transmission where both the digital and voice communication over such a backbone connection is by way of such addressed digital logic packets, wherein the intermediate node is adapted to provide access to a proportion of the backbone bandwidth being less than a full wavelength.

9. A data and voice digital communication network installation covering the geography of Australia providing a backbone communication bandwidth of at least 2.5 gigabytes/second between geographically substantially dispersed locations being primary hubs, and having at least one light transmitting fibre through which the transmission is effected with means at respective ends, being the primary hubs, of the fibre to effect an input and output of the communication signals at a rate which is at least the said bandwidth, and further having at least one intermediate means being a secondary hub which is substantially geographically dispersed from said locations of the primary hubs to effect an input and output through addressed digital logic packets into the fibre, and means to then effect transmission of and signals from said secondary hub to a further geographically dispersed location at a rate which is less than the said bandwidth between said primary hubs, said secondary hub being adapted to provide this lesser bandwidth rate by providing access to a proportion of the backbone communication bandwidth which is less than one wavelength.

10. A data and voice digital communication network substantially as described with respect to any one of the embodiments in the specification with reference to and as illustrated by the accompanying illustrations with respect to that embodiment.